

CLAIMS:

1. A backscatter communication system comprising:

an interrogator including a transmitter configured to output a forward link communication and a receiver configured to receive a return link communication having a carrier signal, the receiver being configured to reduce the amplitude of the carrier signal of the return link communication; and

a communication device configured to modulate the carrier signal to communicate the return link communication responsive to reception of the forward link communication.

2. The backscatter communication system according to claim 1 wherein the communication device comprises a radio frequency identification device.

3. The backscatter communication system according to claim 1 wherein the communication device comprises a remote intelligent communication device.

4. The backscatter communication system according to claim 1 wherein the carrier signal comprises a continuous wave signal.

5. The backscatter communication system according to claim 1 wherein the interrogator comprises a coherent interrogator.

1 6. The backscatter communication system according to claim 1
2 wherein the transmitter is configured to apply a local continuous wave
3 signal to the receiver, and the receiver is configured to receive the
4 local continuous wave signal, adjust the amplitude and phase of the
5 local continuous wave signal to provide an adjusted continuous wave
6 signal, and sum the adjusted continuous wave signal with the return link
7 communication.

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9 7. The backscatter communication system according to claim 6
10 wherein the receiver is configured to match the amplitude of the local
11 continuous wave signal with the amplitude of the return link
12 communication.

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14 8. A backscatter system interrogator comprising:
15 a receiver configured to receive a return link communication
16 comprising a modulated continuous wave signal comprising a radio
17 frequency continuous wave signal having a first frequency and a
18 modulation signal having a different frequency, the receiver being further
19 configured to reduce the amplitude of the return link communication at
20 the frequency of the radio frequency continuous wave signal.

1 9. The backscatter system interrogator according to claim 8
2 further comprising a transmitter configured to output a forward link
3 communication, the radio frequency continuous wave signal and a local
4 continuous wave signal.

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6 10. The backscatter system interrogator according to claim 9
7 wherein the receiver and transmitter are coherent.

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9 11. The backscatter system interrogator according to claim 9
10 wherein the receiver is configured to receive the local continuous wave
11 signal, adjust the amplitude and phase of the local continuous wave
12 signal to provide an adjusted continuous wave signal, and sum the
13 adjusted continuous wave signal with the modulated continuous wave
14 signal.

15
16 12. The backscatter system interrogator according to claim 11
17 wherein the receiver is configured to match the amplitude of the local
18 continuous wave signal with the amplitude of the modulated continuous
19 wave signal.

20
21 13. The backscatter system interrogator according to claim 9
22 wherein the transmitter and receiver are configured to communicate with
23 a radio frequency identification device.

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1 14. A coherent backscatter system interrogator comprising:
2 a transmitter configured to communicate a wireless forward link
3 communication, a wireless continuous wave signal and a local continuous
4 wave signal; and
5 a receiver configured to receive the local continuous wave signal
6 from the transmitter and wireless return link communications comprising
7 modulated continuous wave signals, the receiver being configured to
8 reduce the amplitude of the return link communications using the local
9 continuous wave signal received from the transmitter.

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11 15. The coherent backscatter system interrogator according to
12 claim 14 wherein the transmitter and receiver are configured to
13 communicate with a radio frequency identification device.

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15 16. The coherent backscatter system interrogator according to
16 claim 14 wherein the receiver is configured to receive the local
17 continuous wave signal, adjust the amplitude and phase of the local
18 continuous wave signal to provide an adjusted continuous wave signal,
19 and sum the adjusted continuous wave signal with the modulated
20 continuous wave signal.

1 17. The coherent backscatter system interrogator according to
2 claim 16 wherein the receiver is configured to match the amplitude of
3 the local continuous wave signal with the amplitude of an individual
4 modulated continuous wave signal.

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6 18. The coherent backscatter system interrogator according to
7 claim 14 wherein the wireless continuous wave signal and the local
8 continuous wave signal have a common frequency, and the receiver is
9 configured to reduce the amplitude of the return link communications
10 at the common frequency.

11
12 19. A method of communicating in a backscatter system
13 comprising:

14 transmitting a forward link communication;

15 transmitting a wireless continuous wave signal;

16 receiving the forward link communication;

17 modulating the wireless continuous wave signal responsive to the
18 receiving the forward link communication, the modulating providing a
19 modulated continuous wave signal;

20 receiving the modulated continuous wave signal; and

21 reducing the amplitude of the modulated continuous wave signal.
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1 20. The method according to claim 19 wherein the transmitting
2 the wireless continuous wave signal comprises transmitting the wireless
3 continuous wave signal at a frequency and the reducing comprises
4 reducing the amplitude of the modulated continuous wave signal at the
5 frequency.

6
7 21. The method according to claim 19 wherein the transmitting
8 the wireless continuous wave signal comprises transmitting at a first
9 frequency and the modulating comprises modulating the wireless
10 continuous wave signal using a subcarrier signal having a second
11 frequency.

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13 22. The method according to claim 21 wherein the reducing
14 comprises reducing the amplitude of the modulated continuous wave
15 signal at the first frequency.

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17 23. The method according to claim 19 wherein the transmittings
18 individually comprise transmitting using an interrogator and the
19 modulating comprises modulating using a radio frequency identification
20 device.

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22 24. The method according to claim 19 wherein the modulating
23 comprises selectively reflecting the wireless continuous wave signal.
24

1 25. The method according to claim 19 further comprising
2 providing a local continuous wave signal and the reducing comprises
3 reducing the amplitude using the local continuous wave signal.
4

5 26. The method according to claim 25 wherein the reducing
6 comprises:

7 matching the amplitude of the local continuous wave signal with
8 the amplitude of the modulated continuous wave signal;

9 adjusting the phase of the local continuous wave signal following
10 the matching; and

11 summing the local continuous wave signal and the modulated
12 continuous wave signal following the adjusting.
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14 27. The method according to claim 26 wherein the adjusting
15 comprises searching for a phase which provides maximum reduction of
16 the amplitude of the modulated continuous wave signal at a frequency
17 of the wireless continuous wave signal.
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1 28. A backscatter communications method comprising:
2 transmitting a forward link communication and a wireless
3 continuous wave signal using an interrogator;
4 receiving the forward link communication using a remote
5 communication device;
6 communicating a return link communication comprising a modulated
7 continuous wave signal responsive to the receiving the forward link
8 communication, the communicating including modulating the wireless
9 continuous wave signal using the remote communication device;
10 receiving the modulated continuous wave signal using the
11 interrogator; and
12 reducing the amplitude of the modulated continuous wave signal
13 using the interrogator.

14
15 29. The method according to claim 28 wherein the
16 communicating comprises reflecting the wireless continuous wave signal
17 using a subcarrier signal.

18
19 30. The method according to claim 28 wherein the
20 communicating comprises modulating the wireless continuous wave signal
21 providing a carrier component and side band components.

22
23 31. The method according to claim 30 wherein the reducing
24 comprises reducing the amplitude of the carrier component.

1 32. The method according to claim 31 wherein the reducing
2 comprises substantially maintaining the amplitude of the side band
3 components during the reducing.

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5 33. The method according to claim 28 wherein the transmitting
6 comprises transmitting the wireless continuous wave signal at a frequency
7 and the reducing comprises reducing the amplitude of the modulated
8 continuous wave signal at the frequency.

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10 34. The method according to claim 28 wherein the receiving the
11 forward link communication comprises receiving using a radio frequency
12 identification device.

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14 35. The method according to claim 28 wherein the transmitting
15 comprises transmitting radio frequency signals.

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17 36. The method according to claim 28 further comprising
18 providing a local continuous wave signal and the reducing comprises
19 reducing using the local continuous wave signal.

1 37. A coherent backscatter communication method comprising:
2 transmitting a wireless forward link communication;
3 transmitting a continuous wave signal;
4 providing the continuous wave signal as a local signal;
5 receiving the wireless forward link communication;
6 communicating a wireless return link communication including
7 modulating the continuous wave signal following the receiving;
8 receiving the wireless return link communication; and
9 reducing the amplitude of the wireless return link communication
10 using the local signal.

11
12 38. The method according to claim 37 wherein the
13 communicating comprises reflecting the transmitted continuous wave
14 signal.

15
16 39. The method according to claim 37 wherein the
17 communicating comprises modulating the continuous wave signal providing
18 a carrier component and side band components.

19
20 40. The method according to claim 39 wherein the reducing
21 comprises reducing the amplitude of the carrier component.
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1 41. The method according to claim 40 wherein the reducing
2 comprises substantially maintaining the amplitude of the side band
3 components during the reducing.

4
5 42. The method according to claim 37 wherein the transmitting
6 a continuous wave signal comprises transmitting a continuous wave signal
7 having a frequency and the reducing comprises reducing the amplitude
8 of the modulated continuous wave signal at the frequency.

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10 43. The method according to claim 37 wherein the receiving the
11 wireless forward link communication comprises receiving using a radio
12 frequency identification device.

13
14 44. The method according to claim 37 wherein the transmittings
15 individually comprise transmitting radio frequency signals using an
16 interrogator.

1 45. A method of communicating within a coherent backscatter
2 communication system, the method comprising:
3 outputting a forward link communication;
4 outputting a wireless continuous wave signal;
5 providing a local continuous wave signal;
6 communicating a modulated continuous wave signal responsive to
7 the outputting the forward link communication;
8 receiving the modulated continuous wave signal; and
9 reducing the amplitude of the modulated continuous wave signal

10 including:

11 matching the amplitude of the local continuous wave signal
12 with the amplitude of the received modulated continuous wave signal;
13 adjusting the phase of the local continuous wave signal
14 following the matching providing an adjusted continuous wave signal; and
15 summing the adjusted continuous wave signal with the
16 modulated continuous wave signal.

17
18 46. The method according to claim 45 wherein the adjusting
19 comprises searching for a phase which provides maximum reduction of
20 the amplitude of the modulated continuous wave signal at a frequency
21 of the wireless continuous wave signal.

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23 47. The method according to claim 45 wherein the
24 communicating comprises reflecting the wireless continuous wave signal.

1 48. The method according to claim 45 wherein the outputtings
2 individually comprise transmitting using an interrogator and the
3 communicating comprises communicating using a radio frequency
4 identification device.

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6 49. The method according to claim 45 wherein the
7 communicating comprises modulating the continuous wave signal providing
8 a modulated continuous wave signal having a carrier component and side
9 band components.

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11 50. The method according to claim 49 wherein the reducing
12 comprises reducing the amplitude of the carrier component.

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14 51. The method according to claim 50 further comprising
15 substantially maintaining the amplitude of the side band components
16 during the reducing.

1 52. A method of reducing power within a modulated return link
2 continuous wave signal of a coherent backscatter communication system
3 including an interrogator and a remote communication device, the
4 method comprising:

5 transmitting a radio frequency forward link communication;

6 transmitting a radio frequency continuous wave signal having a
7 first frequency;

8 providing a local continuous wave signal having the first frequency;

9 receiving the radio frequency forward link communication;

10 modulating the radio frequency continuous wave signal following
11 the receiving the radio frequency forward link communication, the
12 modulating comprising reflecting the radio frequency continuous wave
13 signal using a modulation signal having a second frequency and
14 providing a modulated continuous wave signal having a carrier
15 component and plural side band components;

16 receiving the modulated continuous wave signal; and

17 reducing the amplitude of the carrier component of the modulated
18 continuous wave signal including:

19 matching the amplitude of the local continuous wave signal
20 with the amplitude of the modulated continuous wave signal;

21 adjusting the phase of the local continuous wave signal
22 following the matching; and

23 summing the local continuous wave signal and the modulated
24 continuous wave signal following the adjusting.